

INTRODUCTION

On March 23, 2015 and September 16, 2015 two major earthquakes occurred in Chile that is within the South America continental shelf and territory. This territory is covered by six IMS infrasound stations (IS02AR, IS08BO, IS09BR, IS13CL, IS14CL and IS41PA). Using these infrasound stations coupled by seismic stations the two events were analysed to test the operational readiness of the IMS stations. Some of the infrasound stations recorded data that were used to locate the two events while some did not. The probable causes of insufficient data and the results obtained from the analysis are presented in this study.

DATA AVAILABILITY

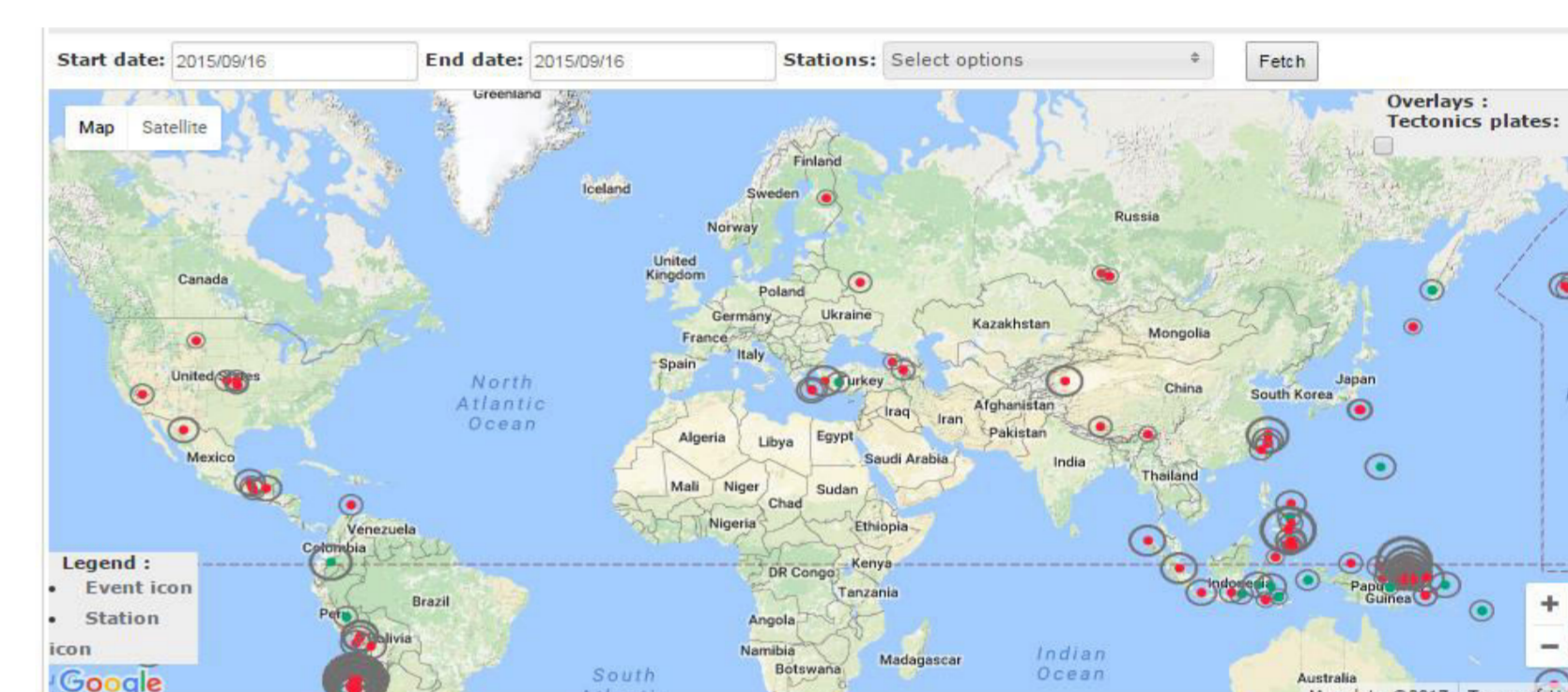
Station	15 Sep 2015	16 Sep 2015	17 Sep 2015
Average	96.86	96.93	86.56
I02AR	100	100	100
I08BO	99.95	100	100
I09BR	99.98	100	99.98
I13CL	97.93	95.9	80.81
I14CL	83.29	85.66	39.14
I41PY	100	100	99.44

KPI Data availability

Station	22 Mar 2015	23 Mar 2015	24 Mar 2015
Average	93.22	93.3	93.07
I02AR	100	100	100
I08BO	100	100	99.93
I09BR	99.82	99.92	99.93
I13CL	92.82	93.2	91.89
I14CL	100	100	100
I41PY	66.67	66.67	66.67

Data availability of the Infrasound stations and Seismic stations within the IMS network during the period was verified in order to assess whether the stations could have detected the event. All the infrasound stations contributed data on the dates that both events occurred.

Station	15 Sep 2015	16 Sep 2015	17 Sep 2015
I02AR	100	100	100
I08BO	99.95	100	100
I09BR	99.98	100	99.98
I13CL	97.93	95.9	80.81
I14CL	83.29	85.66	39.14
I41PY	100	100	99.44



Reviewed Event Bulletin of the IDC

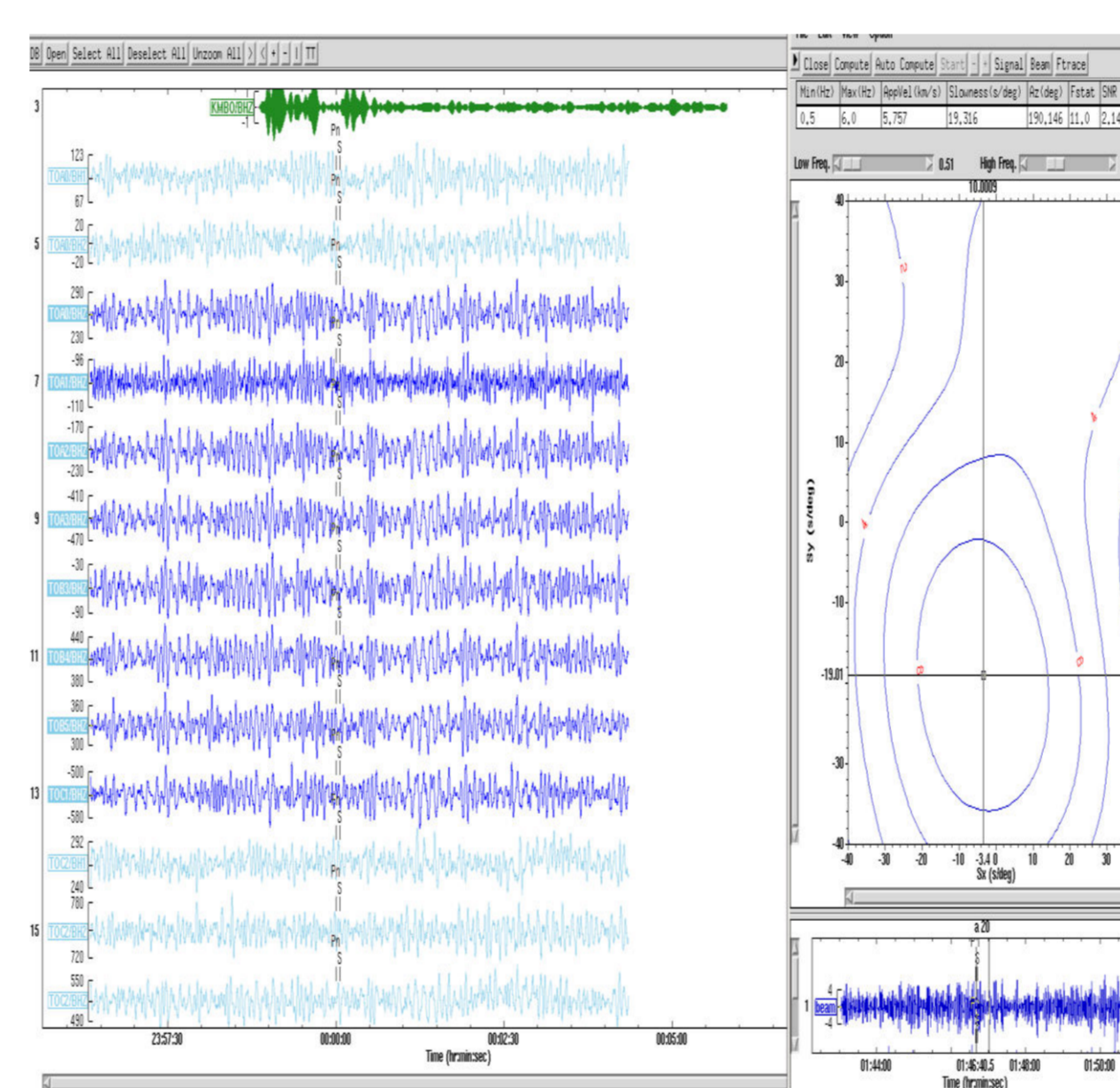
EVENTS IMPACT

DATA INTERPRETATION

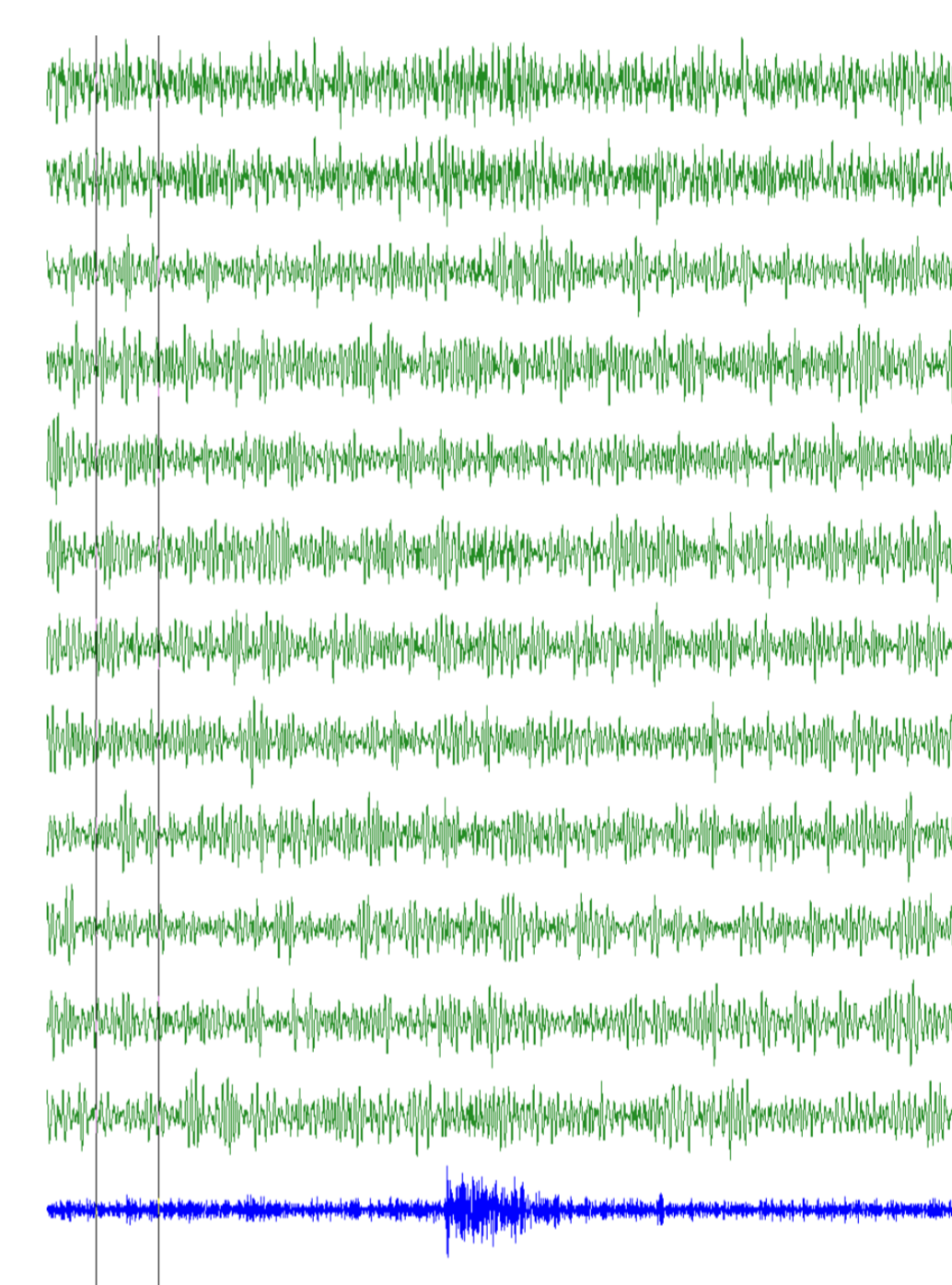
Seismic and infrasound stations within a distance of 20 degrees from the epicentre of the event were used for analysing both events for good location. I08BO and I09BR were the infrasound stations with clear signals that could be used for analysing both events.

Station	Distance	Time	Wave signal clarity
I08BO	2.1	04:52:18	Very Good
LPZA	2.14	04:52:18	Very Good
LVC	4.34	04:52:42	Very Good
SIV	7.93	04:53:31	Very Good
NNA	9.78	04:53:52	Very Good
ATAH	14.33	04:54:54	Good
PTGA	19.56	04:55:56	Good
I09BR	20.26	04:56:07	Fair
PLCA	22.44	04:56:25	Fair

Station	Distance	Time	Wave signal clarity
LVC	9.18	22:56:43	Very Good
PLCA	9.23	22:56:43	Very Good
CPUP	13.49	22:57:42	Good
I08BO	15.5	23:51:50	Good
LPZA	15.48	22:58:10	Good
SIV	18.8	22:58:42	Good
NNA	20.4	22:59:04	Good
I09BR	26.67	23:00:11	Fair



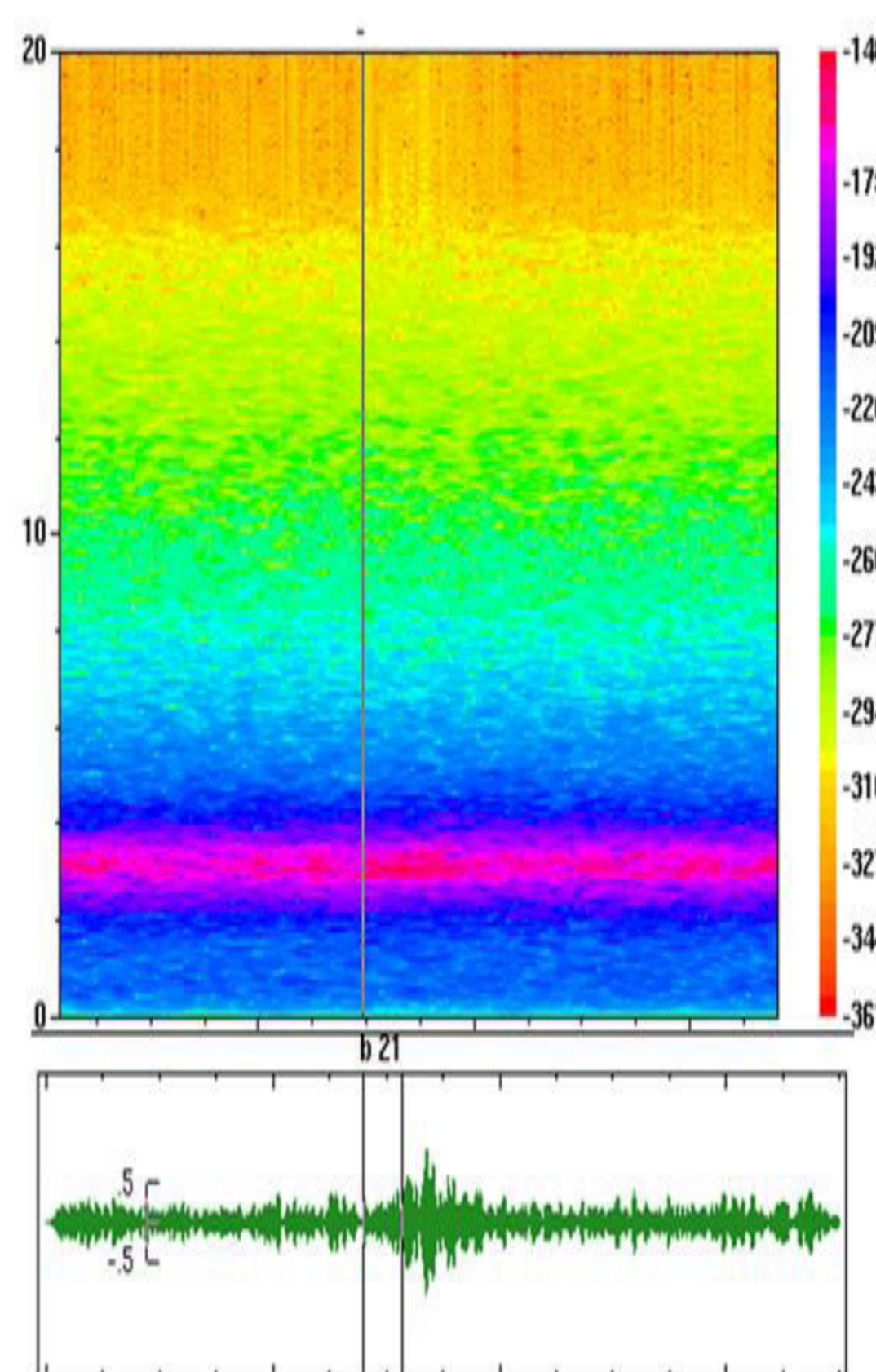
FK analysis



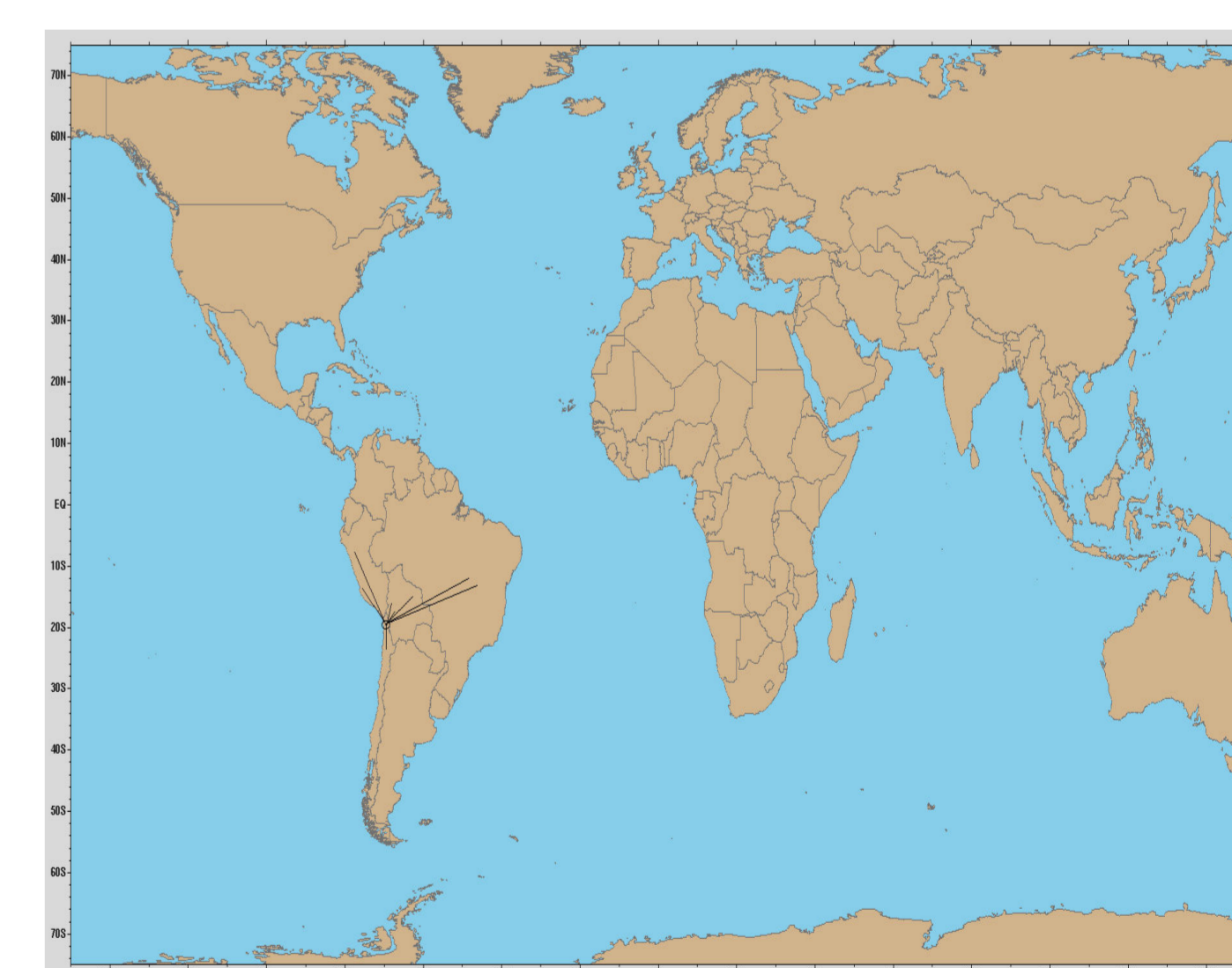
Beaming

The non clarity of signals from the other infrasound stations could be attributed their distance from the epicentre of the event and the noise signal ratio.

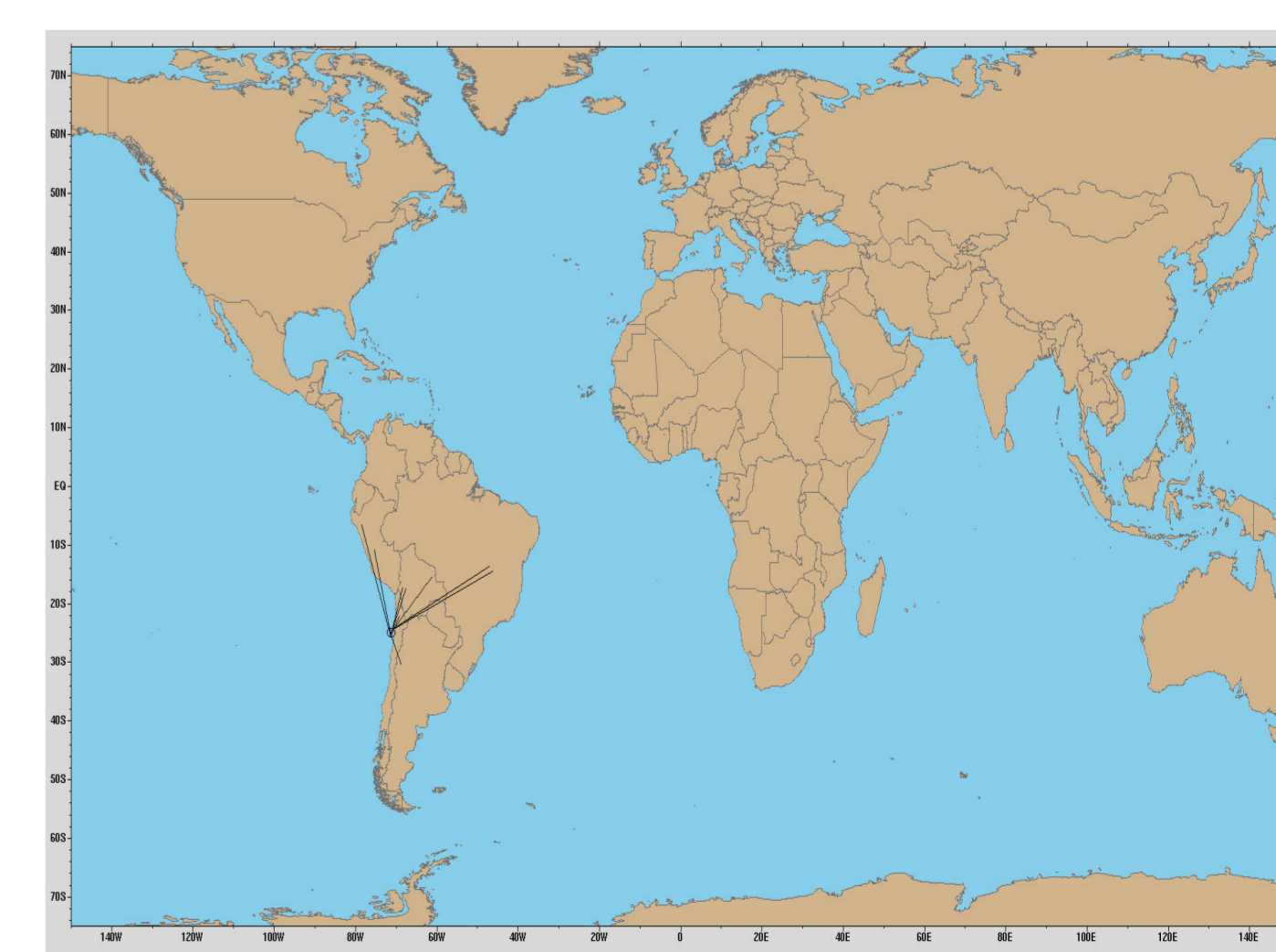
Using the geotool software, waveforms from primary and auxiliary 3-Component and array stations for both events were analysed. Data from the infrasound array stations were analysed using spectrum and energy level. Correlation was used to merge data information from seismic and infrasound stations for locating both events.



Spectral analysis



Location of March 23, 2015 event



Location of September 16, 2015 event

CONCLUSION

The results from the study showed that wave sources located were near the epicentre of the earthquake. The experiences gained from this study strengthened the deployment of the CTBT verification technologies for civil and scientific purposes without a loss to its main objective of monitoring nuclear test by State Parties